

Variation in the African Bat, *Tadarida lobata*,
with Notes on Habitat and Habits
(Chiroptera: Molossidae)

by R. L. Peterson¹



Abstract—Known specimens of *Tadarida lobata* are increased from three to 23 with the addition of a specimen from the Kapenguria area about 80 km SSW of the type locality in northwestern Kenya, and a series of 19 specimens from Maungu Hill in southeastern Kenya. Statistical comparisons of adults of the latter series showed sexual dimorphism in 14 of 23 cranial characters but none in external features. The white interscapular spot is shown to be characteristic of *T. lobata* and may be associated with a glandular area of the skin that is best developed in adults. The palatal ridges number six, the last ridge extending posterior to the level of M². Field observations indicate that *T. lobata* emerge late and are most active around midnight. They are fast, solitary flyers and apparently feed high above the ground.

(morphology; distributions; habitat; habits)

Introduction—*Tadarida lobata* Thomas (1891) was known only from the holotype until Peterson and Harrison (1970) reported two additional specimens. The type

locality, "Turquel, Suk, British East Africa" (=Turkwel, Kenya), cannot be determined precisely, inasmuch as Turkwell is a water course that originates on Mt. Elgon as the Suam River, passes through Turkwell Gorge, and extends northward to near Lodwar and then eastward to Lake Rudolph. To fix the type locality more precisely, I propose that it be restricted to the upper reaches of Turkwell at or near Turkwell Gorge, West Pokot, Kenya (ca. 1°52'N, 35°22'E). One of the specimens (BM 70727 ♂) reported by Peterson and Harrison (1970) was taken at Cherangani Hills (ca. 1°10'N, 35°22'E) some 80 km south of the restricted type locality, and the other (DLH 5.4244 ♂) at Salisbury, Rhodesia, which extended the known range some 2000 km to the south.

Materials and methods—Recently a third specimen from northwestern Kenya (ROM 67958 ♀) collected near Kapenguria (1°14'N, 35°6'E) was received from Robert Glen. In addition, Robin Hutton Seed and Andrew Williams collected 19 specimens in April and May 1973 at Maungu Hill, ca.

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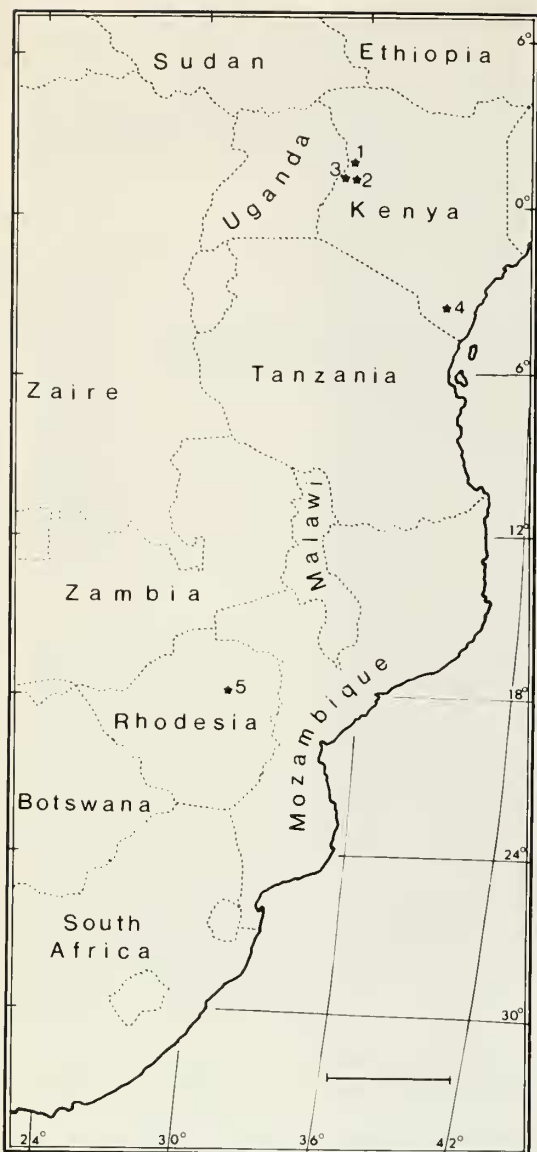


Fig. 1—Known distribution of *Tadarida lobata* (scale bar is 500 km): 1, Type locality; 2, Cherangani Hills; 3, Kapenguria; 4, Maungu Hill, 30 km S Voi; 5, Salisbury, Rhodesia.

30 km S of Voi, Taita Taveta District, in southeastern Kenya ($3^{\circ}30'S$, $38^{\circ}45'E$). This series, consisting of 17 skins and skulls and two specimens preserved in alcohol, included five adult males (ROM 68090, 68109, 68490, 68496, 68359), two subadult males (ROM 68489, 68493), eight adult females (ROM 68107, 68108, 68358, 68488, 68491, 68492, 68495, 68498), and four subadult females (ROM 68089, 68494, 68497, 68499).

All measurements given in millimetres (mm) were taken as defined by Peterson (1972). Weights were recorded in grams (g). Means (\bar{X}) and standard deviations (SD) of adult specimens of the Maungu series were calculated and the sexes compared using Student's *t*-test (Sokal and Rohlf, 1969). Statistical analyses were carried out using the IBM/370 computer at the University of Toronto Computer Centre.

Morphological variation

Sexual dimorphism—Sexes of the adults from Maungu Hill, Kenya, were compared, and results are tabulated in Table 1. No significant differences were found in sixteen external measurements or weight between males (5) and females (8). Of 23 cranial measurements, 14 were significantly different ($P \leq 0.05$). The length of upper and lower tooth rows (C-M³ and C-M₃ respectively), height of the canines, width across lower canines, and length of mandible exhibited strong differences between the sexes ($P \leq .001$).

Geographic variation—Specimens from northwestern Kenya, including the holotype (Table 1), averaged larger than adults from Rhodesia and southeastern Kenya and, without regard to sex, exceeded the size range of specimens from southern Kenya and Rhodesia in the following external characters: length of forearm; third digit, metacarpal and phalanx 1; fourth digit, metacarpal and phalanx 1; fifth digit, metacarpal. The wingspan of ROM 67958 ♀ was 442 mm, as compared with a range of 405–424

for all males and females from southeastern Kenya. Moreover, in cranial measurements the three specimens from northwestern Kenya exceeded the range of other specimens in greatest length, condylobasal length, zygomatic width, and mastoid width.

The apparent larger size of the three specimens from northwestern Kenya may have been influenced by age. They appear to have been fully adult, whereas specimens from Rhodesia and southeastern Kenya included some young adults and may not have represented individuals of normal maximum size.

Variation in pelage colour—the larger sample of *T. lobata* now available provides the first opportunity to examine variation in pelage markings and colour. The interscapular white spot first mentioned by Peterson and Harrison (1970) appears to be characteristic of adult *T. lobata*. When all skins were arranged by age, the white spot was absent in only two subadult females (including 68499; Fig. 2) and indistinctly developed in one young adult male (68490; Fig. 2) and one subadult female. Superficial examination of skins suggests that this spot is associated with a glandular area, although this possibility has yet to be confirmed histologically. This association appears to be consistent with the absence or weak development of a white spot in younger individuals.

The colour pattern of the ventral pelage, although varying from pure white through Warm Buff, Ochraceous-Buff, to a wash of Ochraceous-Orange (Ridgway, 1912), agrees generally with that previously described for *T. lobata* by Peterson and Harrison (1970). In general the pale coloration of *T. lobata* resembles that of *T. africana* and *T. fulminans* but is more extensive than in either of the latter.

The series of *T. lobata* exhibits variation in dorsal pelage coloration that includes Buckthorn Brown, Cinnamon-Brown, and Dresden Brown, with only one specimen (ROM 68107 ♀) matching Mummy Brown. The specimen from Kapenguria (ROM

67958 ♀, Fig. 2) approaches Dresden Brown, whereas the series from southeastern Kenya shows the entire range of the above mentioned colours.

Six specimens have various amounts of white or pale hair behind the junction of the ears with no correlation with sex or age. Wing membranes are consistently pale grey and semi-translucent.

Soft palate—*T. lobata* has six palatal ridges (Fig. 3). *T. africana* and *T. fulminans masoni*, presumably the closest known relatives of *T. lobata*, also have six palatal ridges, but the most posterior ridge is anterior to the level of the posterior margin of M² in these species, whereas in *T. lobata* the last ridge extends more posteriorly.

Field notes—As published data on habits and habitat of *T. lobata* are non-existent, a few field observations provided by our collectors, particularly by Andrew Williams, are given here. The 19 specimens were taken on a large flat plain of open thorn scrub with scattered rocky hills. Nearby Maungu Hill is a high rock outcrop with deep crevices along its cliff face. Two specimens were shot by Seed on 12 April 1973 near an open water tank. Beginning 10 May 1973, Seed and Williams visited a water tank about 3.4 km from the other tank and used 12-gauge shotguns to collect nine specimens the first night, six the second, and two the third. Although obviously attracted to the water, none of the bats was seen to descend to drink and most remained high. Only three or four descended within 7 m of the ground.

Each night the first bats appeared between 22:15 and 22:30 hours, converging on the area around the water tank from random directions. Most observations were between 24:00 and 02:30 hours, but thereafter the bats disappeared. No more than two or three were seen or heard at a time. They uttered a distinctive single- or double-noted, loud squeak that allowed the observers to locate them with a strong spotlight. Flight was usually fast and straight, although a few

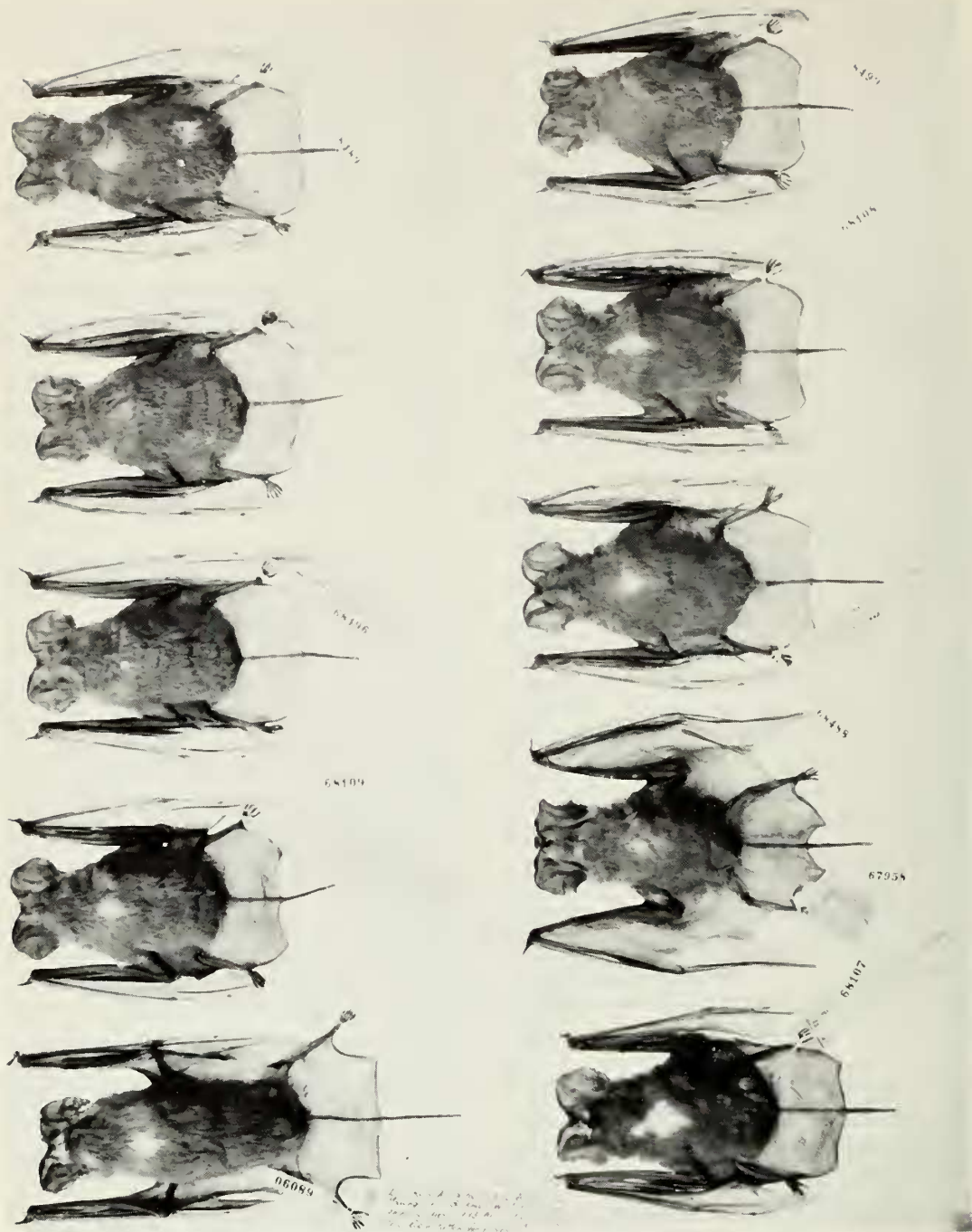


Fig. 2—Variation in dorsal pelage markings in *Tadarida lobata*. All specimens (ROM) are from 30 km S. Voi, Kenya except 67958, which is from near Kapenguria, Kenya. Top row, males: left to right, 68090 adult, 68109 adult, 68496 adult, 68490 young adult, 68489 subadult. Bottom row, females: 68107 adult, 67958 adult, 68488 adult, 68108 adult, 68499 subadult.

bats circled more slowly. Mist nets set over the tanks each night failed to catch *T. lobata*.

The normal roosting sites selected by this species are as yet unknown. Recent observations of *T. fulminans mastersoni*, one of the closest known relatives of *T. lobata*, suggest that a probable roosting site is the crevices located along high rock faces in open, arid or semi-arid terrain.

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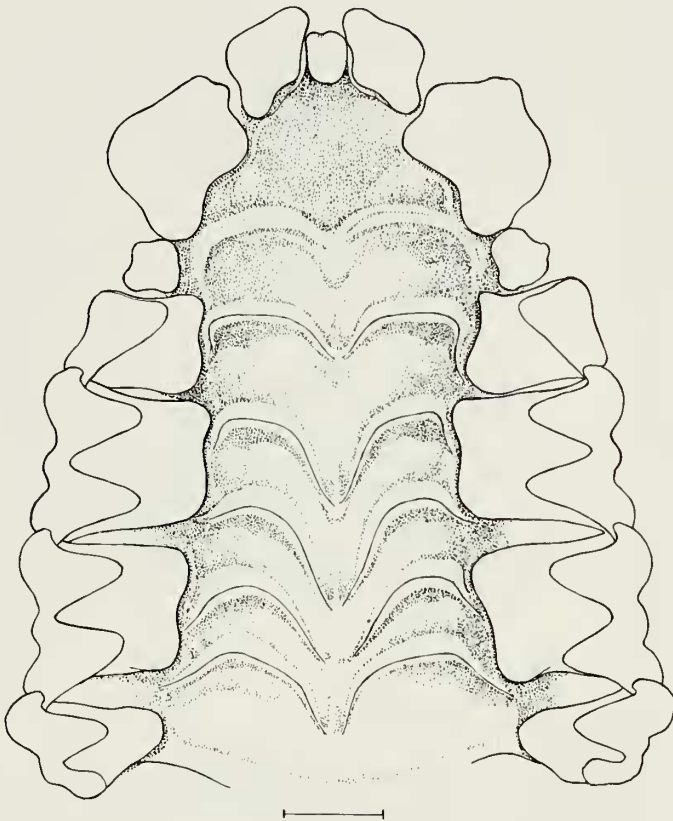


Fig. 3—Soft palate of *Tadarida lobata* ROM 68490 from 30 km S Voi, Kenya (C-M³, 9.1; M³-M³, 8.6); scale bar is 1 mm.

TABLE I

Measurements and sample statistics of adult *Tadarida lobata* and results (*P*) of Student's *t*-test between sexes for specimens from southeastern Kenya

	Northwestern Kenya				Rhodesia				Southeastern Kenya				$\delta\delta$ vs ♀♀ <i>P</i>		
	70.727		67958		5.4244										
	δ	♀	δ	♀	δ	♀	\bar{X}	Range	N	SD	\bar{X}	Range		N	SD
A. EXTERNAL															
Total length	133	—	146	—	134	—	132.6	128-135	5	2.793	129.7	126-133	8	3.196	> 0.05
Tail length	56	56	60	—	53	—	52.8	51-56	5	1.923	51.9	49-54	8	1.727	> 0.05
Hind foot	13	9	10	—	12	—	13.0	12-14	5	0.707	12.8	12-13	8	0.463	> 0.05
Ear from notch	28	32	29	—	—	—	29.4	29-30	5	0.548	29.1	28-30	8	0.641	> 0.05
Length of Tibia	19.5	—	19.0	—	19.5	—	19.3	19.0-19.5	5	0.274	19.6	19-21	8	0.678	> 0.05
Length of forearm	63.0	60.5	61.0	—	58.0	—	58.3	57.5-59.5	5	0.972	57.9	56.5-58.8	8	0.790	> 0.05
3rd Digit: Metacarpal	64.0	61.5	62.0	—	59.4	—	58.7	57.6-59.8	5	0.988	58.8	57.5-59.7	8	0.807	> 0.05
Phalanx 1	25.7	24.5	24.3	—	22.6	—	22.6	22.0-23.7	5	0.691	23.0	22.3-23.8	8	0.493	> 0.05
Phalanx 2	25.1	23.1	22.8	—	23.4	—	21.9	20.4-23.0	5	0.954	21.5	20.7-22.2	8	0.455	> 0.05
4th Digit: Metacarpal	61.8	59.6	59.5	—	57.0	—	57.1	55.5-58.7	5	1.301	56.6	53.5-58.3	8	1.559	> 0.05
Phalanx 1	21.6	21.0	20.4	—	19.8	—	18.8	18.6-19.1	5	0.240	18.9	18.0-20.1	8	0.594	> 0.05
Phalanx 2	10.0	10.0	8.5	—	9.1	—	8.1	7.7-8.7	5	0.364	8.4	7.5-9.5	8	0.650	> 0.05
5th Digit: Metacarpal	39.2	37.8	37.8	—	35.8	—	35.3	33.9-36.8	5	1.054	35.5	34.9-36.6	8	0.645	> 0.05
Phalanx 1	17.5	16.7	15.7	—	16.2	—	15.5	14.4-16.1	5	0.761	15.0	14.1-16.0	8	0.680	> 0.05
Phalanx 2	7.5	7.8	7.0	—	6.9	—	5.9	5.7-6.1	5	0.151	5.9	5.2-6.3	8	0.391	> 0.05
Wingspan	—	—	442	—	—	—	416.8	410-424	5	6.058	412.5	405-418	8	4.440	> 0.05
Weight	—	—	20.0	—	20.0	—	25.5	24.0-28.0	5	1.500	25.8	24-28	8	1.414	> 0.05

TABLE I (Concluded)

	Northwestern Kenya				Rhodesia				Southeastern Kenya				♂♂ vs ♀♀	P			
	Holo- type*		♀		♂		5.4244		♂♂		♀♀						
	70.727	♂	67958	♀	24.2	23.7	22.7	♂	23.27	Range	N	SD			22.71	Range	N
B. CRANIAL																	
Greatest length	24.0	24.2	23.7		22.7	23.27	23.0-23.6	4	0.320	22.71	22.5-23.0	7	0.203	≤0.01			
Condylobasal length	23.4	23.8	23.0		21.9	22.50	22.2-22.8	3	0.300	21.97	21.8-22.3	8	0.190	≤0.01			
Incisor palate length	10.5	10.8	10.1		9.8	9.98	9.8-10.2	5	0.148	9.67	9.4-10.0	8	0.205	≤0.03			
Notch palate length	8.4	8.8	7.8		7.7	7.70	7.6-7.8	5	0.100	7.47	7.3-7.6	8	0.103	≤0.01			
Zygomatic width	14.2	14.2	14.1		13.2	13.40	13.2-13.7	4	0.216	13.30	13.0-13.7	7	0.277	>0.05			
Mastoid width	13.2	13.2	13.2		12.4	12.80	12.7-12.9	4	0.115	12.60	12.4-12.8	7	0.163	>0.05			
Breadth of braincase	11.6	11.4	11.5		11.6	11.32	11.3-11.4	4	0.050	11.45	11.3-11.6	6	0.105	>0.05			
Height of braincase	—	9.4	7.3		7.3	7.47	7.4-7.5	3	0.058	7.36	7.2-7.5	7	0.127	>0.05			
Lachrymal width of rostrum	8.1	7.8	7.6		7.6	7.50	7.3-7.7	5	0.187	7.22	6.9-7.7	8	0.276	>0.05			
Interorbital width	7.6	7.6	7.4		7.4	7.26	7.1-7.5	5	0.152	7.00	6.8-7.2	8	0.151	≤0.03			
Postorbital process width	6.0	5.7	5.8		5.6	5.95	5.9-6.0	4	0.058	5.75	5.6-5.9	8	0.119	≤0.03			
Postorbital constriction	5.0	5.0	4.9		4.9	4.98	4.9-5.1	5	0.109	4.89	4.7-5.1	8	0.146	>0.05			
M ³ -M ³	8.8	9.1	8.9		8.8	8.64	8.6-8.7	5	0.055	8.50	8.3-8.8	7	0.191	>0.05			
C-M ³	9.1	9.3	8.9		8.8	8.98	8.9-9.1	5	0.109	8.74	8.6-8.8	8	0.074	≤0.001			
C-C upper	5.6	5.6	5.4		5.6	5.38	5.3-5.6	5	0.130	5.05	4.7-5.5	8	0.245	≤0.001			
Canine Height	4.3	4.2	3.7		—	4.04	3.9-4.2	5	0.114	3.54	3.3-3.9	8	0.192	≤0.001			
Width basisphenoid pit septum	1.3	1.1	1.3		—	1.17	1.1-1.3	4	0.096	1.09	1.0-1.2	7	0.090	>0.05			
Length basisphenoid pits	1.9	2.5	2.3		—	2.12	2.0-2.3	4	0.150	2.04	1.9-2.2	7	0.097	>0.05			
Mandible																	
Condylolincisive length	16.4	16.7	16.3		—	16.00	15.8-16.3	5	0.187	15.60	15.5-15.7	7	0.082	≤0.03			
Greatest length	17.1	16.9	16.9		16.44	16.56	16.4-16.8	5	0.167	16.04	15.9-16.2	7	0.127	≤0.001			
C-M ³	10.1	10.3	9.8		9.7	9.88	9.7-10.0	5	0.130	9.56	9.4-9.7	8	0.118	≤0.001			
C-C	2.9	3.2	2.6		—	2.84	2.8-3.0	5	0.089	2.55	2.4-2.7	8	0.093	≤0.001			
Canine Height	4.0	3.9	3.2		—	3.64	3.5-3.8	5	0.114	3.09	2.9-3.2	8	0.125	≤0.001			

*sex unknown

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